



CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

NABL - Accredited Laboratory as per ISO / IEC-17025 :2005



Job No.: CTCE/BBMP/W.No.07/MSV/CSR-08/107n/QB(SDBC)/2016-17

03.08.2016

TEST REPORT ON DETERMINATION OF BITUMEN CHARACTERISTICS

*CUSTOMER	:	Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
*AGENCY	:	Mr. M.S. Venkatesh, #15, 4 th Main, 11 th Cross, Coffee Board Layout, Hebbal Kempapura, Bangalore – 24.
*NAME OF THE WORK	:	Improvements roads and drains in Sanjeevini Nagar area in Ward No.07, Kodigehalli Sub Division, BBMP, Bangalore.
REFERENCE	:	AEE/BD/WO/PR/62/2016-17 Dated: 04.07.2016
SAMPLE ID	:	Bitumen
DATE OF SAMPLING	:	01.08.2016
DATE OF TESTING	:	03.08.2016



The results of the tests conducted on the bitumen sample.

Sl. No	Description	Test Method as per IS	Test Result	Requirement as per IS:73:2006
1	Penetration at 25 °C, 1/10 mm	IS :1203 -1978 (RA-2009)	89	80 to 100
2	Softening point, °C	IS :1205 -1978 (RA-2009)	46	Min. 40
3	Ductility at 27°C, cm	IS :1208 -1978 (RA-2009)	100 >	Min. 75
4	Flash Point, °C	IS :1209 -1978 (RA-2009)	290	Min. 220

*Information furnished by the Customer/Representative

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Quality Manager



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Job No.: CTCE/BBMP/W.No.07/MSV/SDBC/AIV/2016-17

03.08.2016

Aggregate Impact Value

IS: 2386 Part IV

Customer	Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
Agency	Mr. M.S. Venkatesh, #15, 4th Main, 11th Cross, Coffee Board Layout, Hebbal Kempapura, Bangalore – 24.
Name of the Work	Improvements roads and drains in Sanjeevini Nagar area in Ward No.07, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	AEE/BD/WO/PR/62/2016-17 Dated: 04.07.2016
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	03.08.2016



Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	385	383	22.40
2	Weight of aggregate passing 2.36 mm sieve after the test = W_2 g	87	85	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	298	298	
4	Aggregate Impact value = percent fines $100 * (W_2/W_1)\%$	22.60	22.19	

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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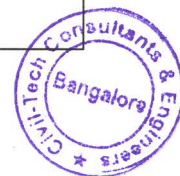


Job No.: CTCE/BBMP/W.No.07/MSV/SDBC/Shape_T/2016-17

: 03.08.2016

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	: Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
Agency	: Mr. M.S. Venkatesh, #15, 4th Main, 11th Cross, Coffee Board Layout, Hebbal Kempapura, Bangalore – 24.
Name of Work	: Improvements roads and drains in Sanjeevini Nagar area in Ward No.07, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	: AEE/BD/WO/PR/62/2016-17 Dated: 04.07.2016
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Semi Dense Bituminous Concrete
Date of Testing	: 03.08.2016



Result : Flakiness Index = **12.56%**

Elongation Index = **13.85%**

Result : Combined Flakiness & Elongation index **26.41%**

Comments:

Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No.07/MSV/SDBC/Stripping/2016-17

04.08.2016

Stripping Value of Road Aggregates (Static Immersion Test)

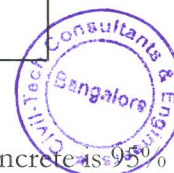
IS: 6241

Customer	Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
Agency	Mr. M.S. Venkatesh, #15, 4th Main, 11th Cross, Coffee Board Layout, Hebbal Kempapura, Bangalore – 24.
Name of the work	Improvements roads and drains in Sanjeevini Nagar area in Ward No.07, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	AEE/BD/WO/PR/62/2016-17 Dated: 04.07.2016
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	04.08.2016



Type of binder : 80/100
Percentage of binder used : 5.0% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.0 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	3.3	3.20	96.80
2	3.1		
3	3.2		



Comments:

→ Minimum allowable Aggregate retained coating for Semi Dense Bituminous Concrete is 95%

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Job No.: CTCE/BBMP/W.No.07/MSV/SDBC/Sp_Wa/2016-17

04.08.2016

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Customer	Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
Agency	Mr. M.S. Venkatesh, #15, 4th Main, 11th Cross, Coffee Board Layout, Hebbal Kempapura, Bangalore – 24.
Name of the Work	Improvements roads and drains in Sanjeevini Nagar area in Ward No.07, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	AEE/BD/WO/PR/62/2016-17 Dated: 04.07.2016
Type of Mix	Semi Dense Bituminous Concrete
Source / Location	Hotmix Plant, Bangalore
Date of Testing	04.08.2016



Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2030	2027	2029	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1275	1272	1274	
4	Weight of saturated surface dry aggregate in air	W_3 g	2013	2014	2012	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_s)$ g	738	742	738	
6	Weight of oven dried aggregate	W_4 g	1999	1996	1995	
7	Specific Gravity	$W_4 / (W_3 - W_s)$	2.709	2.690	2.703	2.701
8	Apparent Specific gravity	$W_4 / (W_4 - W_s)$	2.761	2.757	2.767	2.762
9	Water Absorption	$((W_3 - W_4) * 100) / W_4$	0.70%	0.90%	0.85%	0.82%

Comments:

→ Maximum allowable Aggregate Water absorption value for Semi Dense Bituminous Concrete is 2.0%

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Job No.: CTCE/BBMP/W.No.07/MSV/SDBC/Bitumen/2016-17

04.08.2016

BITUMEN DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

AS per IRC : SP : 11 - 1984

CLIENT	Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
AGENCY	Mr. M.S. Venkatesh, # 15, 4th Main, 11th Cross, Coffee Board Layout, Hebbal Kempapura, Bangalore - 24.
NAME OF THE WORK	Improvements roads and drains in Sanjeevini Nagar area in Ward No. 07, Kodigehalli Sub Division, BBMP, Bangalore.
REFERENCE	AEE/BD/WO/PR/62/2016-17 Dated: 04.07.2016
SAMPLE I/D	Roads in Sanjeevininagar, Ward No. 07.
DATE OF TESTING	04.08.2016



BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	475	474
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	25.00	26.00
7. Bitumen content in %	5.00	5.20
8. Average	5.10	

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Handwritten signature: M. S. Venkatesh
AE (W7)



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Job No.: CTCE/BBMP/W.No.07/MSV/SDBC/Gradation/2016-17

04.08.2016

GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

As per IS : 2386 and IRC : SP : 11 - 1984

CLIENT	Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
AGENCY	Mr. M.S. Venkatesh, # 15, 4th Main, 11th Cross, Coffee Board Layout, Hebbal Kempapura, Bangalore - 24.
NAME OF THE WORK	Improvements roads and drains in Sanjeevini Nagar area in Ward No. 07, Kodigehalli Sub Division, BBMP, Bangalore.
REFERENCE	AEE/BD/WO/PR/62/2016-17 Dated: 04.07.2016
SAMPLE I/D	Roads in Sanjeevinagar, Ward No. 07.
DATE OF TESTING	04.08.2016



GRADATION AFTER EXTRACTION

Sieve Size in mm	Trail 1				Specified Limits as per MORTH specification table 500-15 (Grading-2)
	Weight Retained, gm	% Retained	%Cumulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	25.98	5.47	5.47	94.53	90-100
4.75	250.74	52.79	58.26	41.74	35-51
2.36	53.15	11.19	69.45	30.55	24-39
1.18	51.14	10.77	80.21	19.79	15-30
0.3	32.68	6.88	87.09	12.91	9-19
0.075	30.25	6.37	93.46	6.54	3-8

Sieve Size in mm	Trail 2				Specified Limits as per MORTH specification table 500-15 (Grading-2)
	Weight Retained, gm	% Retained	%Cumulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	31.73	6.69	6.69	93.31	90-100
4.75	255.94	54.00	60.69	39.31	35-51
2.36	53.24	11.23	71.92	28.08	24-39
1.18	41.58	8.77	80.69	19.31	15-30
0.3	25.69	5.42	86.11	13.89	9-19
0.075	33.17	7.00	93.11	6.89	3-8

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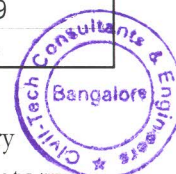
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04.08.2016

Aggregate Gradation Test

IS : 2386 Part I

Customer	Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
Agency	Mr. M.S. Venkatesh, #15, 4th Main, 11th Cross, Coffee Board Layout, Hebbal Kempapura, Bangalore - 24.
Name of the Work	Improvements roads and drains in Sanjeevini Nagar area in Ward No.07, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	AEE/BD/WO/PR/62/2016-17 Dated: 04.07.2016
Sample I / D	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete (SDBC)
Date of Testing	04.08.2016



Total Weight of Sample: 5200 gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
13.2	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
9.5	315	6.1	6.06	93.94	90-100	
4.75	2645	50.9	56.92	43.08	35-51	
2.36	720	13.8	70.77	29.23	24-39	
1.18	495	9.5	80.29	19.71	15-30	
0.3	335	6.4	86.73	13.27	9-19	
0.075	350	6.7	93.46	6.54	3-8	

Total Weight of Sample: 5250 gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
13.2	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
9.5	395	7.5	7.52	92.48	90-100	
4.75	2565	48.9	56.38	43.62	35-51	
2.36	870	16.6	72.95	27.05	24-39	
1.18	525	10.0	82.95	17.05	15-30	
0.3	265	5.0	88.00	12.00	9-19	
0.075	280	5.3	93.33	6.67	3-8	

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Job No.: CTCE/BBMP/W.No.07/MSV/SDBC/Stability/2016-17

04.08.2016

TEST REPORT ON STABILITY OF MIX

Customer	:	Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
Agency	:	Mr. M.S. Venkatesh, #15, 4 th Main, 11 th Cross, Coffee Board Layout, Hebbal Kempapura, Bangalore – 24.
Name of the work	:	Improvements roads and drains in Sanjeevini Nagar area in Ward No.07, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	:	AEE/BD/WO/PR/62/2016-17 Dated: 04.07.2016
Source of location	:	Hot mix Plant, Bangalore
Type of Mix	:	Semi Dense Bituminous Concrete
Date of Testing	:	04.08.2016



The results of the tests conducted on the bituminous mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-16)
1	Marshal Stability, at 60° C, Kn	10.15	10.30	8.2 Kn (min)
2	Marshal flow at 60° C, mm	2.35	2.55	2 – 4
3	Percent air voids	3.40	4.20	3 – 5
4	Percent voids in mineral aggregates (VMA %)	14.25	14.65	13 – 15
5	Percent voids filled with Bitumen (VFB %)	72.50	72.25	65 – 78
6	Density, g/cc	2.28	2.27	---

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